TORREYA

April, 1915.

Vol. 15 No. 4

BRYOLOGICAL NOTES

I. Aschisma kansanum New Species, with Remarks upon the Genus

By A. LeRoy Andrews

The genus *Aschisma* was created by Lindberg in 1878* for a single species of southern Europe and northern Africa which had hitherto passed as a *Phascum*. In the field of distribution of this species (*Aschisma carniolicum* (Weber & Mohr) Lindberg), North America has for some time been erroneously included on the basis of a single collection made by Hall in Kansas. Study of Hall's specimen as represented in the herbarium of the New York Botanical Garden has shown me that it represents an entirely different and apparently as yet unrecognized species. The American plant which grows gregariously with abundant persistent protonema stands somewhat higher (up to 2 mm.), the dry plants having leaves somewhat subsecund and rather concealing the capsule from view. The leaves are longer than in the European plant (up to 1.5 mm.), of different shape, from a long narrow clasping base of very thin-walled hyaline cells widening to well up near the apex, giving a rather spatulate or obovate effect to the leaf as a whole. The leaf shows a remarkably broad costa, up to 70 μ at the base and even 25 μ in its excurrent mucro, and in section at least 4 entirely included guide-cells with stereid bands both dorsally and ventrally. The cells of the leaf-blade, apart from the long narrow very thin-walled ones of the basal part, are rather thick-walled, the lumen appearing roundish or of somewhat irregular shape, the cell-diameter

* Utkast naturl. grupper. 28.

[No. 3, Vol. 15 of Torreya, comprising pp. 41–62, was issued 15 April 1915.]

being about 7–10 μ. These cells are very strongly papillose on both surfaces, a single large central projection being long-pointed or more commonly irregularly shaped or slightly pronged terminally. This arrangement of papillae leaves the cell-walls very clearly defined. A border region is considerably differentiated beginning at or near the apex and running downward with a width of about 2 cells until it finally widens to join the differentiated basal cells. The cells of this border lack the papillae and are about twice as long as wide. This border differentiation is very striking both in leaf-section and surface-view. The inflorescence is autoicous, the antheridia on an inconspicuous lateral branch. The capsule is small and well included in the leaves, nearly spherical (.4 mm. in diameter) with an inconspicuous apiculus, without operculum; its color is a shining yellowish brown, it is connected by a very short seta (.08 mm.) to the vaginule, which is cylindrical or elongated barrel-shaped (.23 mm. high and half as thick) without swollen base. The epidermis of the capsule constitutes a thin brittle plate, striking in a palisade-like arrangement of the exothecial cells except at base and apex. These are very elongate vertically with the two long sides parallel, the ends angular or straight, making the cells elongated rectangular to hexagonal (up to 15×50 μ). The thin lines of cell-division are the natural lines of fracture and the capsule seems very brittle along them so that the spores are quickly lost. The latter are light yellow in color, very slightly roughened and about 15–20 μ in diameter.

In the European species, several specimens of which I owe to the kindness of Mrs. Britton and Dr. Roth, the plant does not appear so raised from the substratum, lacks the conspicuous superficial protonema* and averages in fact rather shorter, with shorter leaves, and capsule much larger in proportion and more conspicuously exposed.† The color of the capsule is a more reddish brown, its apiculus is still less pronounced, its outer membrane not so brittle, nor its exothecial cells quite so long

*Limpricht says (Rabenhorst, Kryptogamen Flora, IV, 1, 195. 1886) that the protonema of *A. carniolicum* is subterranean.

†Fleischer (Malpighia, VII, 317. 1893) gives maximum dimensions of the plant and leaves of *A. carniolicum* equalling or excelling those of *A. kansanum*.

and narrow nor so regular in arrangement; the seta is thicker, the vaginule shorter in proportion to its thickness and brown-reticulate, more narrowed at top, the spores are darker and more strongly papillose.* The leaves are more crisped when dry, ovate-lanceolate in outline, the hyaline cells of the base are decidedly thicker walled, while those above are thinner walled than in the American plant, more regularly quadrate to roundish hexagonal, not differentiated at border, the papillae are quite different, not projecting so far, generally several (up to 4) per cell on either surface, rather regular and rounded in shape, by their disposal toward the cell-walls leaving the cells apparently less sharply set off than in the American species. The costa is very decidedly weaker, only about 40 μ at base and not so strongly excurrent. In section the costa has normally but two fully included guide-cells with a band of thick-walled stereid cells dorsally but not ventrally, where there is generally a single layer of fairly large thin-walled cells, sometimes a tendency to a second layer.†

A. kansanum is not the first species to have been added to Lindberg's originally monotypic genus. Limpricht‡ included with the original species as var. *speciosum* a form to which an herbarium name *Phascum speciosum* Moris had been attached and the same was later proposed, though not very seriously, as of specific rank by Fleischer§ and apparently accepted as such by Limpricht.|| In 1901¶ Brotherus included a second African species, *A. aethiopicum* (*Ephemerum aethiopicum* Welwitsch & Duby, 1871) as having been already assigned to this genus by Lindberg in manuscript. Roth gives later** a description and figure, from which it appears clearly that the plant is specifically distinct from *A. carniolicum*. At the same time Roth also included a description and figure of a South American species,

* Fleischer (l. c.) again mentions variation.

† Fleischer (l. c.) gives conditions of costa-section more nearly approaching those of *A. kansanum*.

‡ Op. cit. 196. 1886.

§ Op. cit. 317. 1893.

|| Op. cit., III, 637. 1901.

¶ Engler & Prantl, Die natürlichen Pflanzenfamilien, I, 3, 383.

** Die aussereuropäischen Laubmoose, I, 173; pl. XX, fig. 7. 1911.

A. occultum (*Phascum occultum* Carl Müller).* Dr. Roth very kindly sent me a bit of this species from Ule's *Bryotheca brasiliensis*, which though a somewhat similar plant is obviously specifically quite distinct from both *A. carniolicum* and *A. kansanum*. Thériot added another species from New Caledonia, *A. neocaledonicum*.† A description and figure were later furnished by Roth.‡ A specimen in Thériot's *exsiccati* (*Musci et hepaticae Novae-Caledoniae*, no. 126) shows a plant with no particular affinities with the other species placed under *Aschisma*, but clearly referable to *Astomum*.

I have included our North American species in *Aschisma* not from inner conviction, but from disinclination to remove it irresponsibly from the place where it has for some time reposed. As a matter of fact I cannot regard it as naturally congeneric with the European species, constituting the type of this genus; it is however not referable to any other genus of cleistocarpous mosses. As to the European *Aschisma* I am not fully satisfied that its natural affinities are with *Astomum* as Lindberg and Brotherus place it.§ Lindberg was at any rate obviously right in separating it from *Phascum* and the latter genus as left still seems to me a very heterogeneous one. Loeske || has already separated *Pottiella* from the European aggregate, but the exotic species have not been adequately dealt with. The new North American species should probably form the type of a new genus, but so long as the complex of moss-forms left by Brotherus in *Pottiaceae* is phylogenetically so little understood as at present I have not cared to add to the confusion.

It is somewhat remarkable that the plant has not been rediscovered since Hall found it, but our cleistocarpous mosses have hardly been given the attention they deserve. Hall's locality "prairies of western Kansas" is also a trifle vague, but the addition of "silicious soil" may help in further search. What is meant is a soil containing quartz in larger or smaller grains,

* Op. cit., I, 172; pl. XVIII, fig. 1.

† Bull. de l'Acad. de Geogr. Bot., 1911, p. 4. (I have not seen this publication.)

‡ Hedwigia, LIII, 93; pl. II, fig. 5. 1913.

§ Loeske has also (Zur Morphologie und Systematik der Laubmoose, 74 1910) given it a different place in the vicinity of *Phascum*.

|| Verh. bot. Ver. Prov. Brandenburg 47: 322: 1906.

pebbles, etc., the same type of soil by the way chosen by the European and South American species assigned to *Aschisma*. Hall appears to have noted it in more than one place. His original material is now represented in this country by a specimen at the New York Botanical Garden which had been sent to Austin by Lesquereux, and by specimens in the Sullivant and James herbaria at Harvard University. Professor Farlow has kindly furnished me the following from a letter from Lesquereux found with the Sullivant specimen, dated Jan. 1, 1872, the words being quoted by Lesquereux from a letter from Hall: " I am interested in this little moss from the flint pebbles in the Kansas prairies. It grows also a thick leathery confervoid stratum* and is remarkable for affecting only flint pebbles or small flint rocks at their base, forming a thallus or coat frequently all around the stones below."

Ithaca, N. Y.

DESCRIPTION OF A NEW FOSSIL FERN FROM THE JUDITH RIVER FORMATION OF MONTANA†

By F. H. Knowlton

Fossil ferns in a fruiting condition are of such comparatively rare occurrence that the finding of a new one is still worthy fo record, and this is the warrant for the present brief notice. The material which has furnished the basis for the following diagnosis was obtained the past season (1914) by Mr. E. Russell Lloyd, of the U. S. Geological Survey, in the so-called Judith coal field of Montana. These specimens are so fragmentary that they would hardly be worthy of more than passing notice if it was not for the fact that the fruit is preserved in such a high degree of perfection. The form may be known as:

Fig. 1. *Dryopteris Lloydii*, sterile pinnule, × 3

* The protonema.

† Published with the permission of the Director of the U. S. Geological Survey.